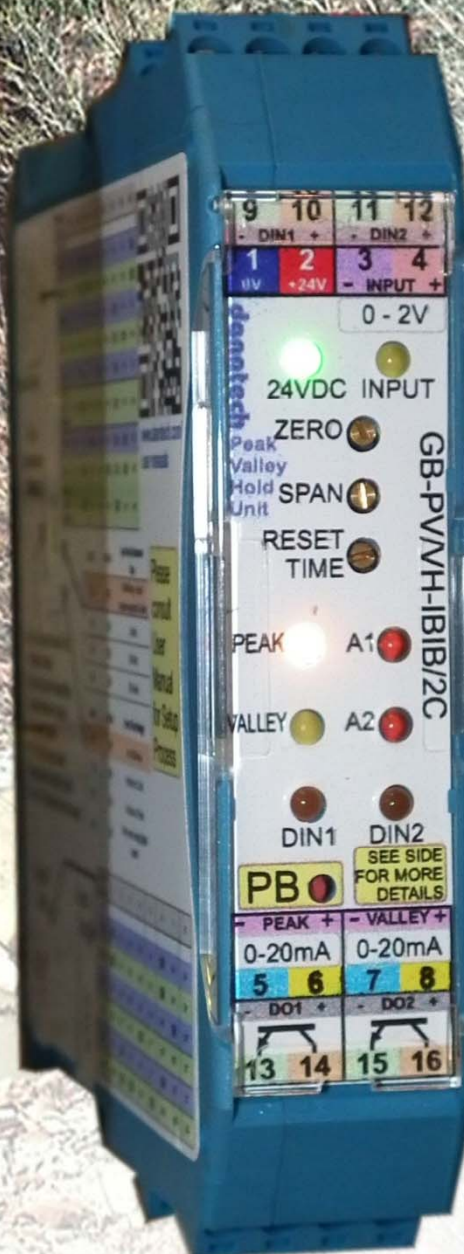


Peak/Valley Hold
Unit (PVHU) User
Manual V3.00



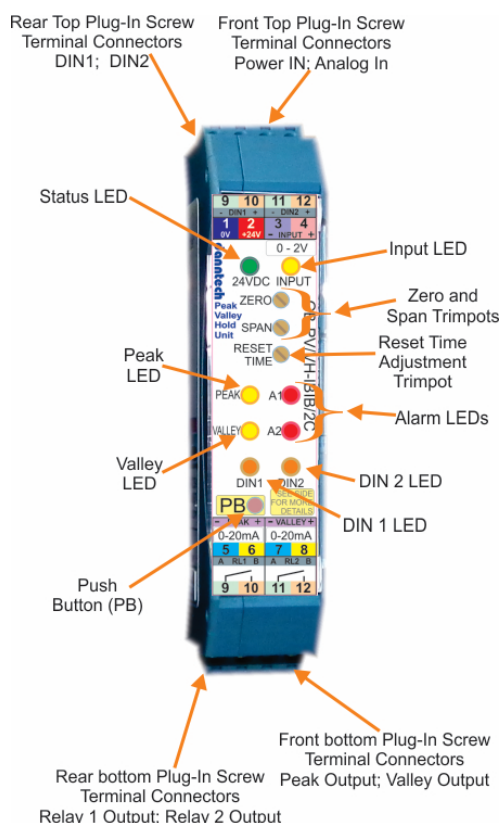
Peak/Valley Hold Unit (PVHU) User Manual

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General Description

The Peak/Valley Hold Unit (PVHU) has been designed to provide a way of capturing fast, random or transient events for process measurement and control. Usually only high speed and expensive process systems or PLCs are able to monitor and capture these inputs.



The PVHU has one input and two outputs which can be used to capture the maximum (peak) and minimum (valley) values of the input signal. The PVHU captures the maximum and minimum values and holds these values until either another maximum or minimum value is detected, or the RESET TIME expires. The Reset Time can be adjusted from 0% to 100% (using a trimpot) in three ranges: 4 to 100 mS, 4 to 1000 mS and 4 mS to 10 S. There is an additional option to hold the peak and valley outputs until an external digital input resets the captured values.

The PVHU has four way galvanic isolation of 1000 VDC between the Power In, the input and each output. The outputs are isolated from each other.

A variety of standard signal inputs and outputs can be accommodated:

Current (DC): 4-20 mA, 0-20 mA, (factory installed options are 0-1 A, 0-5 A and 0-10 A).

Loop power available at +15 V, 22 mA for loop powered transmitter inputs.

Voltage (DC): 0-100 mV, 0-1 V, 0-2 V, 0-10 V, 0-30 V, 0-100 V and ± 10 V.

Resistance: 0-100 Ω , 0-1 k Ω , 0-10 k Ω .

There is also an option to be able provide 15 V at 30 mA to supply power for a loop powered input sensor or transmitter.

The outputs can be different from each other and also different to the input, so the unit can effectively perform signal conversion and isolation functions as well. Special input and output ranges can be provided by arrangement.

The unit has two analogue outputs with various options:





Current (DC): 4-20 mA, 0-20 mA.

Voltage (DC): 0-100 mV, 0-1 V, 0-10 V, ± 10 V.

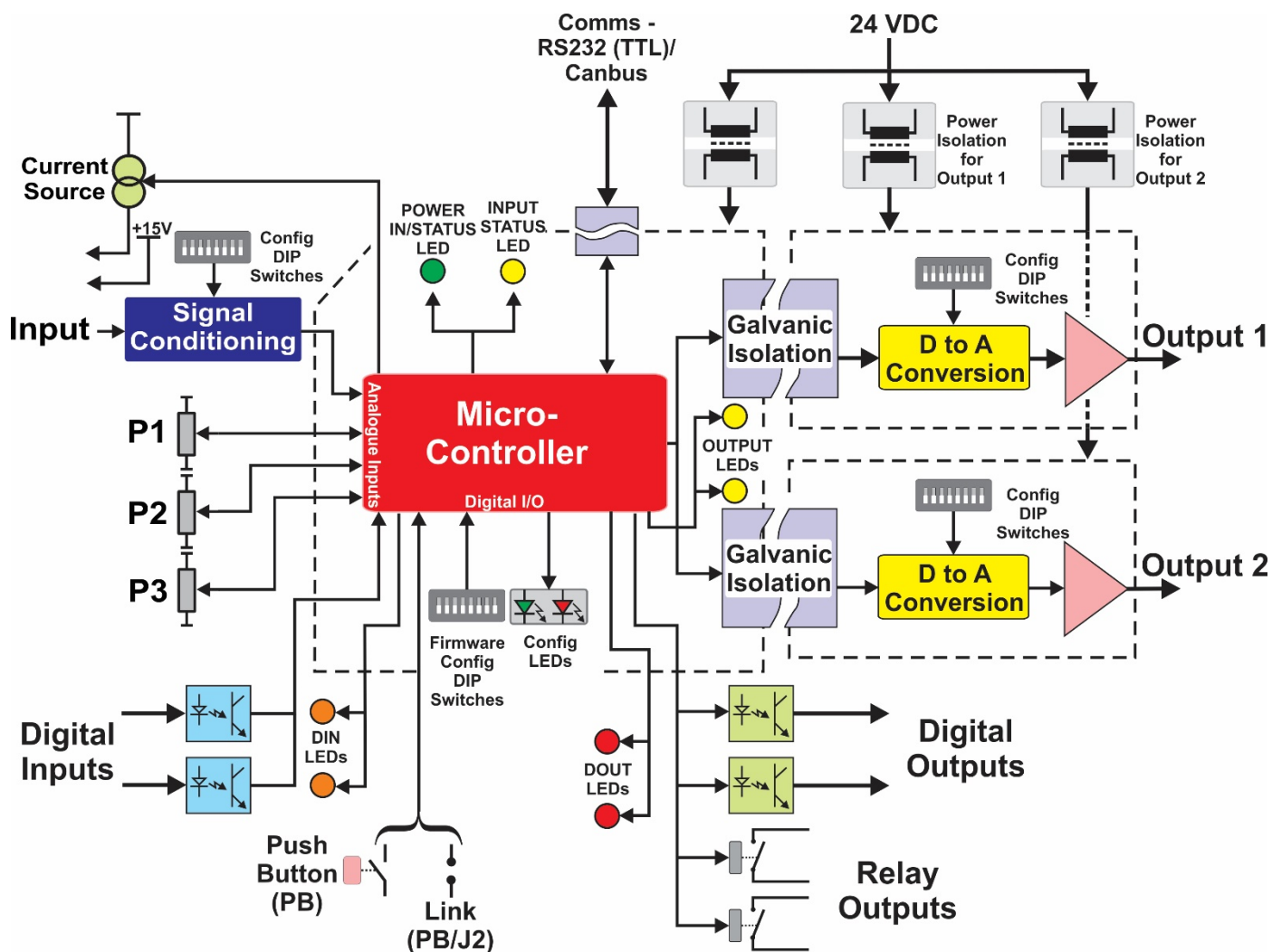
As well as some digital I/O options:

- ☐ **Relay Outputs** - optional: Two alarm relay outputs 30 VDC at 1 A / 125 VAC, 0.3 A.
- ☐ **Digital Outputs** - optional: Two opto-isolated transistor outputs up to 50 V at 40 mA maximum.
- ☐ **Digital Inputs** - optional: Two opto-isolated digital inputs 30 V maximum at 5 mA.

Applications

-  Fast pulse stretching so that transient events can be captured by standard (slower) controllers or PLCs.
-  Accelerometer peak level capture for machine condition monitoring.
-  Hydroelectric turbine generator pole temperature estimation (see application note).
-  Monitoring of rotor alignment in rotating machines using valley detection.

Functional Diagram

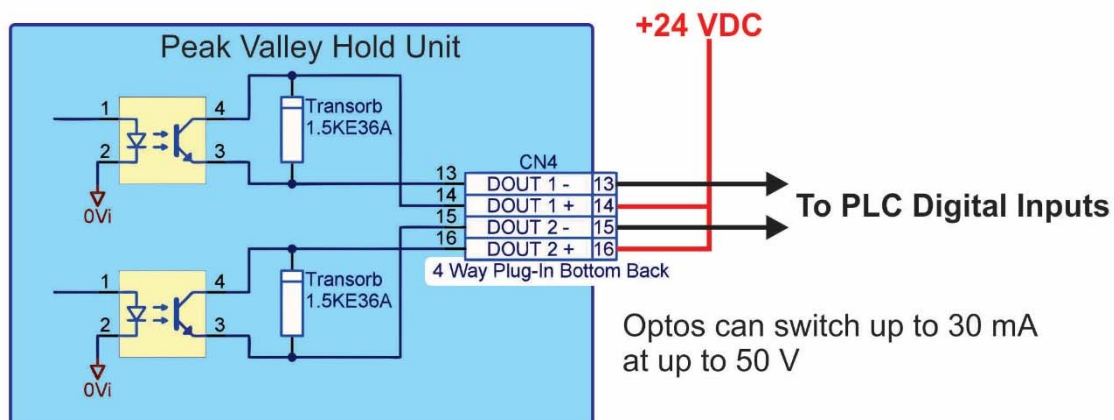
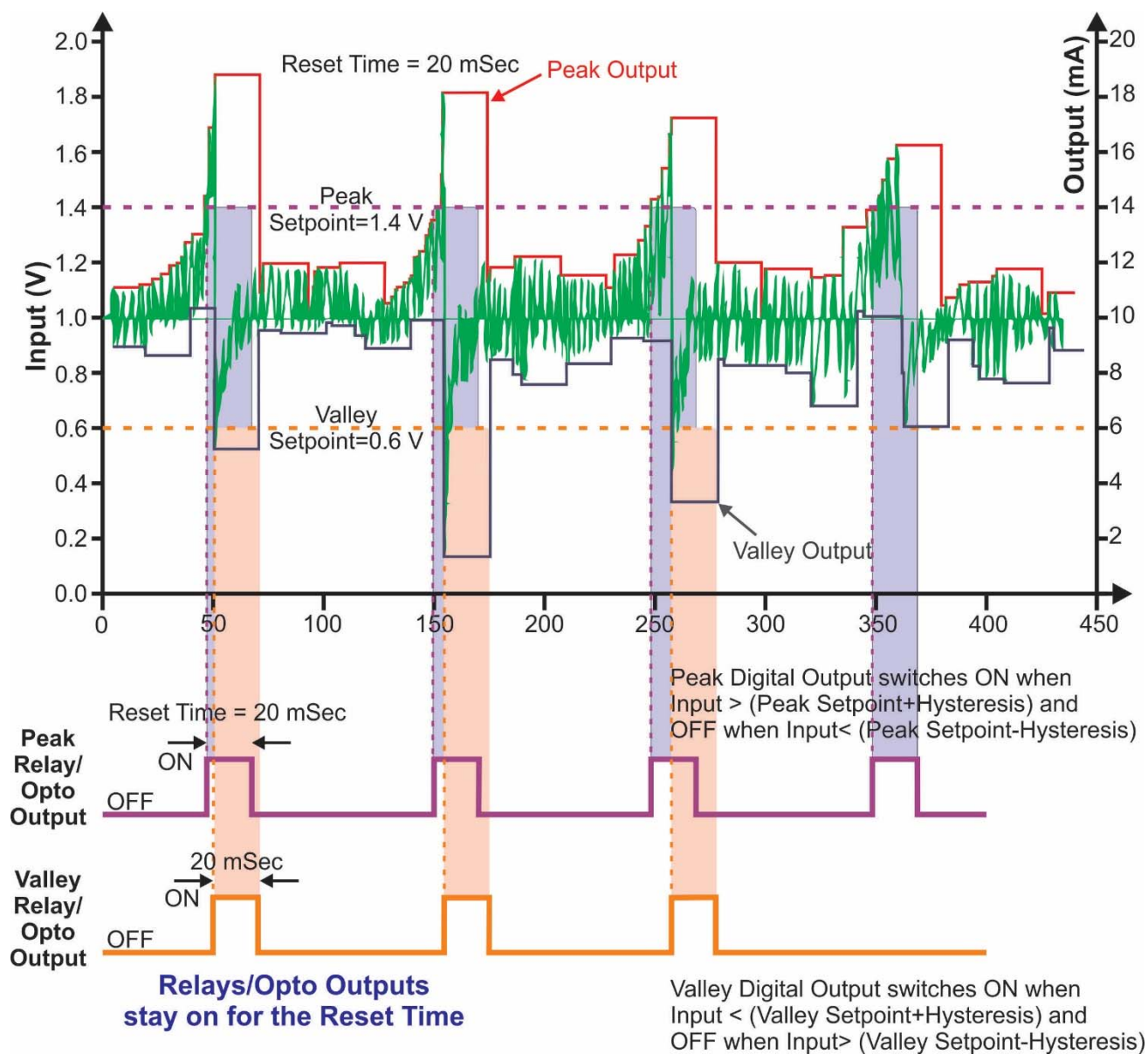


Example Operation



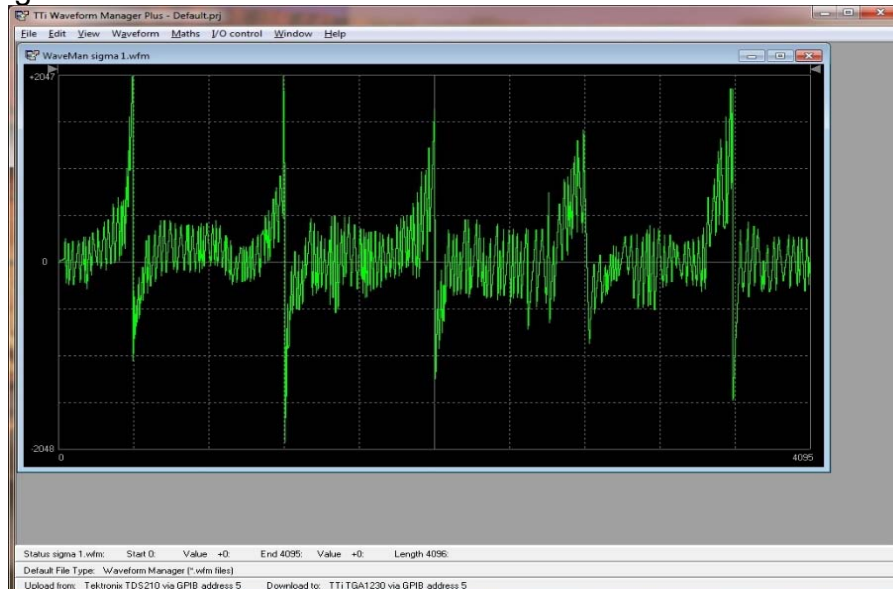
These oscilloscope traces show the input signal in yellow with the Peak Output in blue and the Valley output in purple. This shown is an example of the outputs one can expect for a fairly high frequency input signal with a fairly short reset time, in this case approximately 20 mS.

Typical Operation

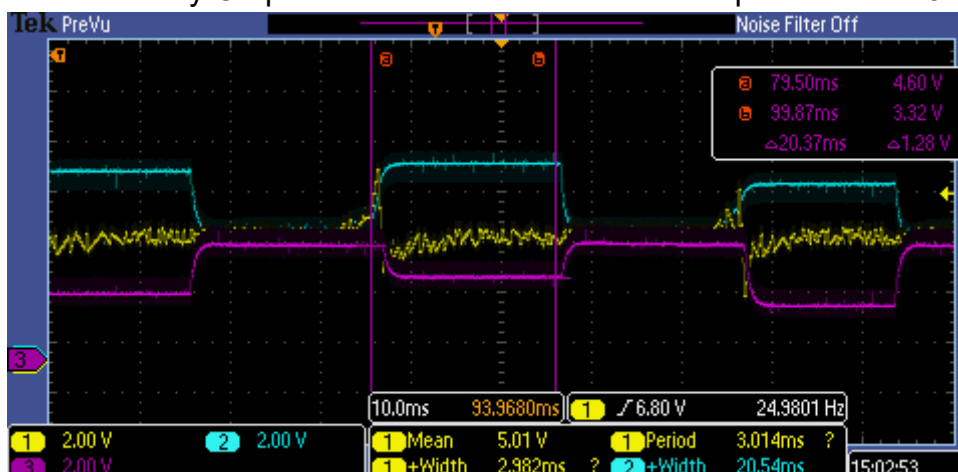


Application Example

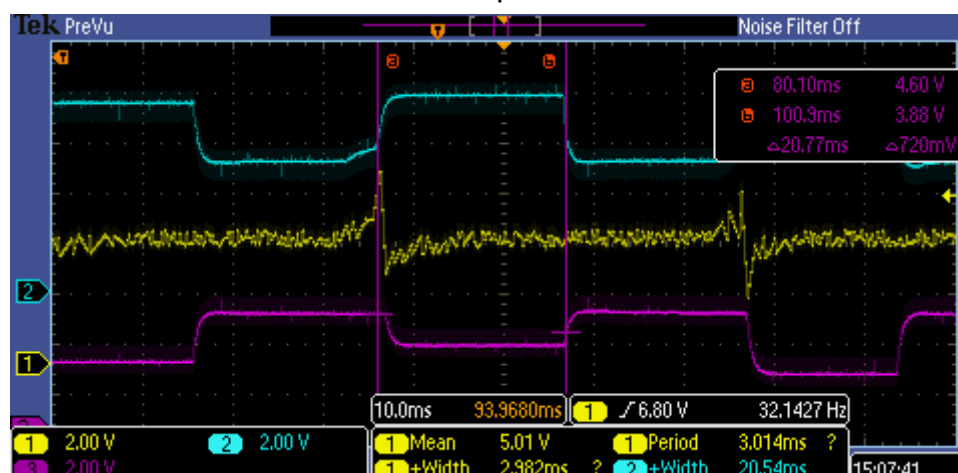
Simulated input signal constructed from data captured on site by the customer and sent to us for testing.



Yellow trace is the simulated input signal, the blue trace is the Peak Output and the purple trace is the Valley Output. The Reset Time in this example is about 20 mS.

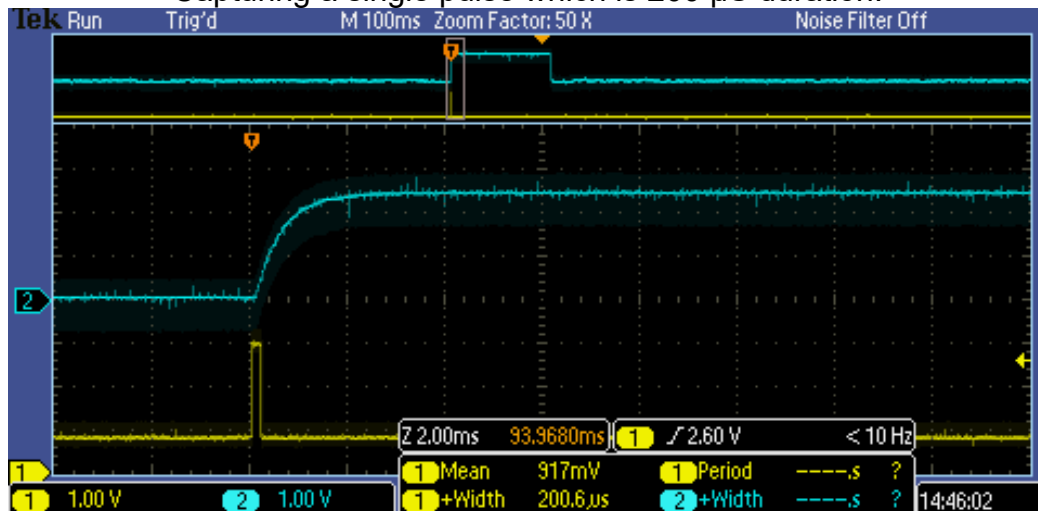


The same results as above with the traces separated to show more detail.

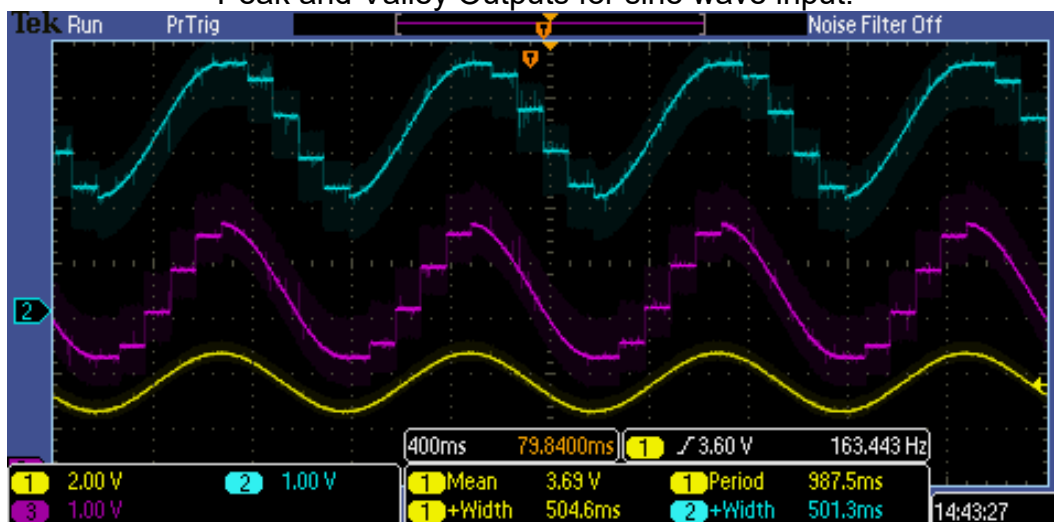


Oscilloscope Pictures

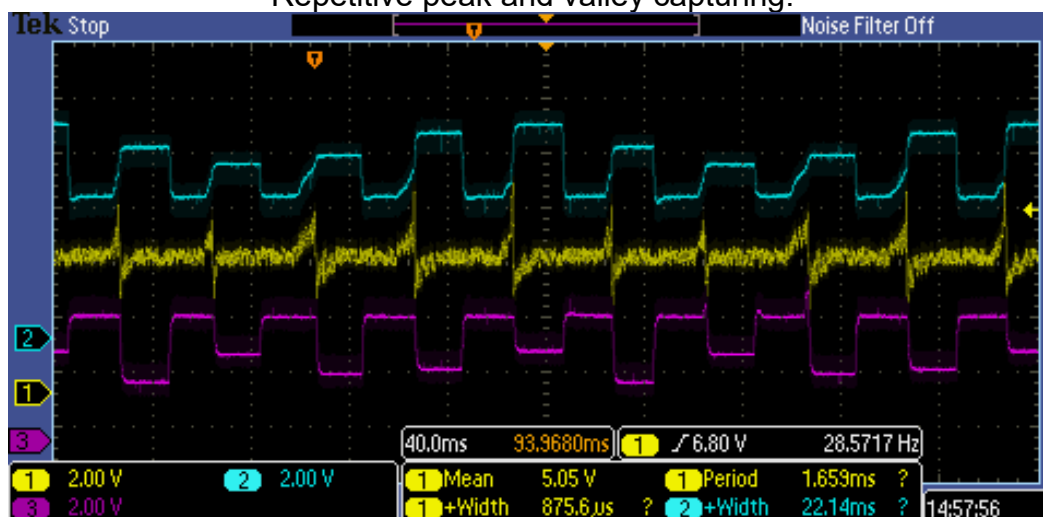
Capturing a single pulse which is 200 μ S duration.



Peak and Valley Outputs for sine wave input.



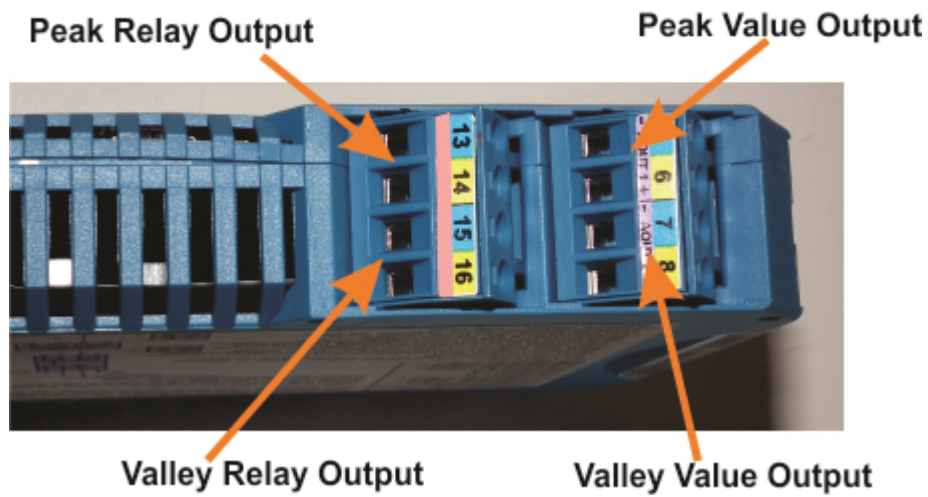
Repetitive peak and valley capturing.



Connections

More information to follow.

Bottom View



DIP SW1 Run/Operational Settings

Table 1 Dip Switch SW1 Settings in Run Mode – coloured background indicates settings as shipped.

SW1	Description	Default Setting															
1	<p><i>Zero, Span and Reset Time Trimpots Enable</i> Enables the operation of the trimpots on the front panel. You can enable the trimpots, make your adjustments and then when you disable the trimpots, the values that you last adjusted are saved and used until the trimpots are enabled again. OFF = trimpots disabled ON = trimpots enabled</p>	ON															
2	<p><i>Zero and Span Normal/Wide Range Adjustment Select</i> Provides “normal” and “wide” trimpot adjustments for Zero and Span. OFF = Zero and Span adjustment are normal i.e. approx $\pm 10\%$ over full trimpot range. ON = Zero and Span adjustment are “wide” i.e. approx $\pm 50\%$ over trimpot range. Note that you may need to adjust zero and span several times to get the best accuracy.</p>	OFF															
3	<p><i>Filtering Select</i> Selects the moving average input filter length:</p> <table border="1"> <thead> <tr> <th>SW1-3</th><th>SW1-4</th><th>Input Step Response Time</th></tr> </thead> <tbody> <tr> <td>OFF</td><td>OFF</td><td>No filtering – input response approx 0.2 mSec</td></tr> <tr> <td>OFF</td><td>ON</td><td>1 mSec</td></tr> <tr> <td>ON</td><td>OFF</td><td>10 mSec</td></tr> <tr> <td>ON</td><td>ON</td><td>100 mSec</td></tr> </tbody> </table>	SW1-3	SW1-4	Input Step Response Time	OFF	OFF	No filtering – input response approx 0.2 mSec	OFF	ON	1 mSec	ON	OFF	10 mSec	ON	ON	100 mSec	OFF
SW1-3	SW1-4	Input Step Response Time															
OFF	OFF	No filtering – input response approx 0.2 mSec															
OFF	ON	1 mSec															
ON	OFF	10 mSec															
ON	ON	100 mSec															
4		OFF															
5	<p><i>Reset Range Select</i> Value set using RESET trimpot on the front of the unit.</p> <table border="1"> <thead> <tr> <th>SW1-5</th><th>SW1-6</th><th>Reset Time Range</th></tr> </thead> <tbody> <tr> <td>OFF</td><td>OFF</td><td>4 to 100 mSec</td></tr> <tr> <td>OFF</td><td>ON</td><td>4 mSec to 1 Sec</td></tr> <tr> <td>ON</td><td>OFF</td><td>4 mSec to 10 Sec</td></tr> <tr> <td>ON</td><td>ON</td><td>Only reset using Digital Inputs</td></tr> </tbody> </table>	SW1-5	SW1-6	Reset Time Range	OFF	OFF	4 to 100 mSec	OFF	ON	4 mSec to 1 Sec	ON	OFF	4 mSec to 10 Sec	ON	ON	Only reset using Digital Inputs	OFF
SW1-5	SW1-6	Reset Time Range															
OFF	OFF	4 to 100 mSec															
OFF	ON	4 mSec to 1 Sec															
ON	OFF	4 mSec to 10 Sec															
ON	ON	Only reset using Digital Inputs															
6		OFF															
7	<p><i>Relays/Opto Outputs Enable (this feature not implemented yet)</i> OFF = Relays/Opto Outputs Disabled ON = Relays/Opto Outputs Enabled</p>	OFF															
8	<p><i>Run or Configuration Mode Select</i> OFF = Run ON = Configuration</p>	OFF															

Configuration Mode

When SW1-8 is ON then the configuration mode is activated. Only the relevant DIP switches may be used, i.e. only one switch between SW1-7 and SW1-2 (SW1-8 needs to be on to be in this mode and SW1-1 selects how to do the configurations using the analogue input or the trimpots).

Table 2 Configuration Mode DIP Switch SW1 settings.

SW1	Description	Default Setting														
1	<p>This DIP switch performs two functions depending upon what is being configured:</p> <p><i>Input or Trimpot Selection for Output Calibration</i> i.e. SW1-6 or SW1-7 is ON. OFF = Analogue Input is used to excite the output ON = The trimpots are used to excite the output, Zero Trimpot for minimum and Span Trimpot for the maximum.</p> <p><i>Digital Output Sense Select for Digital Output Setup</i> i.e. SW1-3 is ON. This switch setting at the time of capturing the Digital Output Setpoint selects whether the respective Digital Output is active when the input goes from low to high (for a Peak) , or from high to low (for a Valley). OFF = Low to High ON = High to Low</p>															
2	<p><i>Test Mode</i> Repeated pressing of the push button sets the following on both outputs, repeated pressing restarts the cycle:</p> <table><tr><td>Push Button Press Number</td><td></td></tr><tr><td>0</td><td>Outputs follow the input as per normal operation</td></tr><tr><td>1</td><td>Outputs at absolute minimum (DAC output=0)</td></tr><tr><td>2</td><td>Outputs at 0%</td></tr><tr><td>3</td><td>Outputs at 50%</td></tr><tr><td>4</td><td>Outputs at 100%</td></tr><tr><td>5</td><td>Outputs at absolute maximum (DAC output=4095)</td></tr></table>	Push Button Press Number		0	Outputs follow the input as per normal operation	1	Outputs at absolute minimum (DAC output=0)	2	Outputs at 0%	3	Outputs at 50%	4	Outputs at 100%	5	Outputs at absolute maximum (DAC output=4095)	
Push Button Press Number																
0	Outputs follow the input as per normal operation															
1	Outputs at absolute minimum (DAC output=0)															
2	Outputs at 0%															
3	Outputs at 50%															
4	Outputs at 100%															
5	Outputs at absolute maximum (DAC output=4095)															
3	Digital Output Setup															
4	Input LED Setup															
5	Input Calibrate															
6	Output 1 Calibrate															
7	Output 2 Calibrate															
8	<p>Run or Configuration Mode Select OFF = Run ON = Configuration</p>	OFF														

Resetting to Factory Defaults

Sometimes this is necessary if one gets things confused.

To do this, switch all SW1 switches ON except SW1-8, then press the PB for >2 seconds. The factory defaults areas shown in the Table 2 Configuration Mode DIP Switch SW1 settings. **[not yet implemented in V3.01]**

Trimming of Outputs - Zero and Span Adjustment

If the Zero and Span Trimpot are enabled (i.e. SW1-1 is ON in the RUN Mode) the outputs Zero and Span can be trimmed. Can only be done in the Run Mode. This is done by pressing and holding the Push Button (PB) for one second or more until the A2 LED first comes on and then shortly after, the A1 LED illuminates, this then sets the unit into the *Output Trim* mode. (if SW1-1 is OFF nothing will happen).

The Peak LED will be on.

Now you can trim the Peak Output Zero and Span using the trimpots. If you wish to move to the Valley Output without changing the Peak Output just press the PB briefly, this moves on to the next output without capturing the trimpot adjustments.

If you wish to adjust the zero and span and capture the new values, press the PB for about 1 second until A2 comes on and then release, this will capture the new trimpot values for the Peak Output and move on to the Valley Output.

Repeat until both the outputs are done.

When the Valley Output is done the unit goes back into the *Run* mode.

Input Range Selection

DIP Switch SW1 #	1/A	2/B	3/C	4/D	5/E	6/F	7/G	8/H
Input								
4-20mA	OFF	ON	ON	OFF	OFF	OFF	OFF	ON
0-20mA	OFF	ON	ON	OFF	OFF	OFF	OFF	ON
0-100mV	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
0-1V	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF
0-10V	OFF	ON	OFF	ON	OFF	ON	OFF	OFF
0-30V (J3 in R2=620Ω)	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF
0-100V	OFF	OFF	ON	OFF	OFF	ON	ON	OFF
±10V	OFF	ON	OFF	OFF	ON	ON	ON	OFF
0-2V (J3 in R2=1.1kΩ)	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF

For self-powered mA input (normal operation) – J1=A, J2=A

For loop powered mA input (with fused +15 V supply) – J1=B; J2=B

Output Range Selection

Information to follow.

Analogue Input Setup

Information to follow.

Input LED Setup

Information to follow.

Analogue Output Setup

Information to follow.

Digital Output Setup

Information to follow.

Specifications

- One analogue input, two isolated analogue outputs one for Peak (maximum) value and the other for Valley (minimum) value.
- Input and each output can be configured differently if required. For example the input can be 0-10 V, the Peak output can be 4–20 mA and the Valley output could be ± 5 V.
- Galvanic isolation between input, power supply and each output > 1000 VDC.
- DC supply required – 12 or 24 VDC, -5%, +10% at 100 mA max.
- Typical step response time (input to output) - less than 0.2 mS.
- Split rail powered input circuit to accommodate input signals from ± 100 V down to ± 100 mV or ± 100 mA down to ± 100 μ A.
- Standard process signal inputs available, 0-10 V, 0-5 V, 0-2 V, ± 10 V, 0-20 mA, 4-20 mA. Also factory configured currents 0 – 1 A, 0 – 5 A, 0 – 10 A AC or DC.
- Input impedance standard for voltage inputs at 100 k Ω but can be arranged to be 1 M Ω if required. Input impedance is 50 Ω for mA current inputs.
- DC coupled input signal as standard but can be arranged to be AC coupled if required.
- Analogue input resolution 0.1% of input range.
- Input sampling and processing frequency approximately 10 kHz (100 μ S).
- Minimum input pulse width for reliable detection – 0.2 mS.
- Split rail powered output circuit - output signals from ± 12 V down to ± 100 mV.
- Output current for voltage output option at 5 mA.
- Output current range for current output option from 0 to 22 mA.
- Analogue output resolution 0.05% of range.
- Overall accuracy better than 1% of range.
- Output trimpot zero and span adjustments for each output on front panel.
- Reset time adjustable using trimpot beneath front panel from 0 to 100% of the selected range.
- Operating temperature -10°C to +70°C.
- Power On/Status green LED.
- Plug-in screw terminals which can accommodate wire up to 2.0 mm².
- DIN rail mounting enclosure - 22.5 x 100 x 113 mm (width x length top to bottom x height off DIN rail).
- Approximate weight 100 g.

User Manual

The latest version of this User Manual can be found at:

[http://www.danntech.com/user%20manuals/Peak_Valley%20Hold%20Unit%20\(PVHU\)%20User Manual.pdf](http://www.danntech.com/user%20manuals/Peak_Valley%20Hold%20Unit%20(PVHU)%20User%20Manual.pdf)

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